

CLAIMS

What is being claimed is:

1. A system comprising:
a radiation source capable of emitting first light; and
a fluorescent material capable of absorbing the first light and emitting second light having a different wavelength than the first light, wherein said fluorescent material comprises a phosphor having the formula $(\text{Lu}_{1-x-y-a-b}\text{Y}_x\text{Gd}_y)_3(\text{Al}_{1-z}\text{Ga}_z)_5\text{O}_{12}:\text{Ce}_a\text{Pr}_b$ wherein $0 < x < 1$, $0 < y < 1$, $0 < z \leq 0.1$, $0 < a \leq 0.2$ and $0 < b \leq 0.1$.
2. The system of claim 1 wherein the first light comprises light having a peak emission wavelength in the range of 400 to 480 nm.
3. The system of claim 1 wherein the first light comprises light having a peak emission wavelength in the range of 438 to 456 nm.
4. The system of claim 1 wherein the first light comprises light having a peak emission wavelength in the range of 330 to 365 nm.
5. The system of claim 1 wherein the radiation source is a light emitting diode.
6. The system of claim 1 wherein the second light is green light.
7. The system of claim 1 wherein the fluorescent material is a first fluorescent material, the system further comprising a second fluorescent material capable of emitting third light.
8. The system of claim 7 wherein the third light comprises red light.
9. The system of claim 7 wherein the second fluorescent material comprises an Eu(II)-activated phosphor.
10. The system of claim 7 wherein the second fluorescent material comprises $(\text{Sr}_{1-x-y}\text{Ba}_x\text{Ca}_y)_2\text{Si}_5\text{N}_8\text{O}_x:\text{Eu}$ wherein $0 \leq a < 5$, $0 < x \leq 1$, $0 \leq y \leq 1$, and $0 < z \leq 1$.
11. The system of claim 7 wherein the second fluorescent material comprises $\text{Sr}_2\text{Si}_5\text{N}_8:\text{Eu}^{2+}$.
12. The system of claim 7 wherein the second fluorescent material comprises $(\text{Sr}_{1-x}\text{Ca}_x)\text{S}:\text{Eu}$.
13. The system of claim 7 wherein:
the first fluorescent material and the second fluorescent material are disposed over the radiation source as discrete layers; and

the second fluorescent material is closer to the radiation source than the first fluorescent material.

14. The system of claim 13 further comprising a layer of transparent material disposed between the first fluorescent material and the second fluorescent material.

15. The system of claim 7 wherein:
the first fluorescent material is disposed over a first portion of the radiation source;
and
the second fluorescent material is disposed over a second portion of the radiation source.

16. The system of claim 7 wherein:
the first fluorescent material is disposed over the radiation source in a plurality of first discrete regions; and
the second fluorescent material is disposed over the radiation source in a plurality of second discrete regions.

17. The system of claim 16 wherein the plurality of first discrete regions and the plurality of second discrete regions form a pattern.

18. The system of claim 16 further comprising a transparent material disposed over the radiation source in a plurality of third discrete regions.

19. The system of claim 7 wherein:
the second fluorescent material is disposed over the radiation source in a plurality of first discrete regions; and
the first fluorescent material is disposed over the second fluorescent material.

20. The system of claim 7 further comprising a third fluorescent material capable of emitting fourth light.

21. The system of claim 20 wherein the fourth light comprises blue light.

22. The system of claim 1 wherein particles of the first fluorescent material are coated with a layer of one or more compounds selected from the group formed by the fluorides and orthophosphates of the elements aluminum, scandium, yttrium, lanthanum gadolinium and lutetium, the oxides of aluminum, yttrium and lanthanum and the nitride of aluminum.